

REMARKS

The Office Action dated November 1, 2005, has been received and reviewed.

Claims 1-63 are currently pending and under consideration in the above-referenced application. Each of claims 1-13, 17-45, 50, 51, and 54-63 stands rejected, while claims 14-16, 46-49, 52, and 53 recite allowable subject matter.

Reconsideration of the above-referenced application is respectfully requested.

Supplemental Information Disclosure Statement

Please note that a Supplemental Information Disclosure Statement was filed in the above-referenced application on December 3, 2004, but that the undersigned attorney has not yet received any indication that the references cited in the Supplemental Information Disclosure Statement have been considered in the above-referenced application. It is respectfully requested that the references cited in the Supplemental Information Disclosure Statement of December 3, 2004, be considered and made of record in the above-referenced application and that an initialed copy of the Form PTO/SB/08A that accompanied that Supplemental Information Disclosure Statement be returned to the undersigned attorney as evidence of such consideration.

Rejections under 35 U.S.C. § 102

Claims 1, 3-9, 35, 36, and 43 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent Publication 2003/0114016 of Tischler (hereinafter "Tischler").

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Tischler describes a wafer handling system that may be used in conjunction with process tools such as an "epitaxial thin film deposition reactor." Paragraph [0007]. Examples of epitaxial thin film deposition reactors include sputtering chambers and other physical vapor

deposition (PVD) reactors, chemical vapor deposition (CVD) reactors, and atomic layer deposition (ALD) reactors. As epitaxial thin film deposition chambers deposit material indiscriminately, rather than in accordance with a program, epitaxial thin film deposition chambers are not programmable material consolidation apparatus.

Independent claim 1 is directed to a programmable material consolidation apparatus. As Tischler lacks any express or inherent description of a programmable material consolidation apparatus, the 35 U.S.C. § 102(e) rejection of independent claim 1 cannot be maintained.

Each of claims 3-9, 35, 36, and 43 is allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Claim 35 is additionally allowable since Tischler lacks any express or inherent description of an ejection element. Rather, the description of Tischler at paragraph [0060] is limited to use of suction to pick wafers up.

Claim 36, which depends from claim 35, is further allowable because Tischler includes no express or inherent description of an ejection element that is configured to remove at least one substrate from a retention system.

Claim 43 is further allowable because Tischler does not expressly or inherently describe a retention system that includes a locking ring. While Fig. 4 of Tischler has been cited in support of the rejection of claim 43, it is not clear which element of the apparatus shown in Fig. 4 would comprise a locking ring.

It is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 1, 3-9, 35, 36, and 43 be withdrawn and that each of these claims be allowed.

Rejections under 35 U.S.C. § 103(a)

Claims 2, 10-13, 17-34, 37-42, 44, 45, 50, 51, and 54-63 stand rejected under 35 U.S.C. § 103(a).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally

available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Tischler in View of Zhang

Claims 2 and 57 have been rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is allegedly unpatentable over the subject matter taught in Tischler, in view of teachings from U.S. Patent 6,158,346 to Zhang (hereinafter "Zhang").

Claim 2 is allowable, among other reasons, for depending directly from claim 1, which is allowable.

Moreover, it is respectfully submitted that the teachings of Tischler and Zhang do not support a *prima facie* case of obviousness against either claim 2 of independent claim 57.

In particular, it is respectfully submitted that, without the benefit of hindsight that the claims and disclosure of the above-referenced application have provided to the Office, one of ordinary skill in the art wouldn't have been motivated to combine teachings from Tischler and Zhang in the manner that has been asserted. Most notably, the Office has not established any viable reason that one of ordinary skill in the art would have been motivated to use the handling apparatus of Tischler with the three-dimensional printing apparatus of Zhang. As Zhang explains, the apparatus described therein already includes a moveable stage 26. Any modification of the adaptable stage, without some convincing motivation, would merely result in unnecessary complication of the moveable stage 26 of that apparatus.

Moreover, the disclosure of Tischler is limited to carriers that basically act as adapters that allow epitaxial thin film deposition reactors to hold substrates with shapes or dimensions that differ from the substrate shapes or dimensions that the reactors were designed to contain. As there is no indication from the disclosure of Zhang that the moveable stage 26 of the apparatus thereof could not hold substrates of certain shapes or dimensions, there would be no reason for

one of ordinary skill in the art to substitute the wafer carrier of Tischler for the moveable stage 26 of the apparatus of Zhang.

Moreover, one of ordinary skill in the art wouldn't have had any reason to expect the purported combination of reference teachings to be successful. This is because the carrier of Tischler must be used in conjunction with another transfer apparatus, which uses a suction pick-up head to place substrates on the carrier and to remove substrates from the carrier. *See* Tischler, paragraph [0060]. As one of skill in the art would be readily aware, vacuum pick-up heads are useful for picking up objects with substantially planar surfaces. The surfaces of substrates that have undergone processing in accordance with teachings from Zhang, however, are not substantially planar. *See, e.g.,* Zhang, col. 2, lines 24-26.

In view of the foregoing, it is clear that the asserted combination of teachings from Tischler and Zhang constitutes hindsight reconstruction, in which teachings from the references were selected merely to fulfill the requirements of the claims.

As a *prima facie* case of obviousness cannot be established against claim 2 or claim 57 based upon teachings from Tischler and Zhang, the subject matter recited in both of these claims is allowable under 35 U.S.C. § 103(a).

Tischler in View of Jensen

Claims 10, 11, and 40-42 are rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is assertedly unpatentable over teachings from Tischler, in view of the teachings of U.S. Patent Publication 2001/0032111 of Jensen, Jr. et al. (hereinafter "Jensen").

Claims 10, 11, and 40-42 are each allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

Each of claims 10, 11, and 40-42 is further allowable since neither Tischler nor Jensen, nor any combination thereof may be used to establish a *prima facie* case of obviousness. In particular, without the benefit of hindsight, one of ordinary skill in the art wouldn't have been motivated to combine teachings from Tischler, which relate to wafer carriers that are configured for use in epitaxial thin film deposition reactors, with the teachings of Jensen, which are directed to processes for fabricating polishing pads. More specifically, without the benefit of hindsight

that the claims and specification of the above-referenced application afford, it is not understood how or why one of ordinary skill in the art would have been motivated to fabricate a polishing pad in accordance with the teachings of Jensen on a wafer supported by the wafer carrier of Tischler.

Therefore, it is respectfully submitted that each of claims 10, 11, and 40-42 is drawn to subject matter that is allowable under 35 U.S.C. § 103(a).

Tischler in View of Huang

Claims 12, 13 and 17 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Tischler, in view of teachings from U.S. Patent Publication 2003/0173713 to Huang (hereinafter “Huang”).

Each of claims 12, 13, and 17 is allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

Furthermore, it is respectfully submitted that Tischler and Huang do not provide teachings that support a *prima facie* case of obviousness against any of claims 12, 13, or 17.

In particular, it is respectfully submitted that, without the benefit of hindsight that has been made available to the Office by the claims and disclosure of the above-referenced application, one of ordinary skill in the art wouldn't have been motivated to immerse the wafer carrier of Tischler within the liquid-filled chamber of a stereolithography apparatus of Huang. Specifically, Tischler does not provide any motivation to use the support thereof anywhere other than in a reactor for depositing epitaxial thin films. Moreover, it appears from the disclosure of Huang, that the work surface 28 of Huang operates as intended; indicating that there would be no reason for one of ordinary skill in the art to use a carrier for facilitating the introduction of wafers into a reactor that is configured to be used with differently shaped or dimensioned wafers in place of the work surface 28.

Further, Huang lacks any teaching or suggestion that the apparatus described therein could even be used to form one or more objects on a substrate.

As such, under 35 U.S.C. § 103(a), the subject matter recited in claims 12, 13, and 17 is allowable over the subject matter taught in Tischler and Huang.

Tischler in View of Cheng

Claims 20-26, 37-39, 44, and 45 have been rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is allegedly unpatentable over teachings from Tischler, in view of the teachings of U.S. Patent 5,304,248 to Cheng et al. (hereinafter “Cheng”).

Claims 20-26, 37-39, 44, and 45 are each allowable, among other reasons, for depending directly or indirectly from claim 1, which is allowable.

Additionally, neither Tischler nor Cheng includes any teaching or suggestion of a programmable material consolidation apparatus.

Claim 37 is also allowable since Tischler and Cheng both lack any teaching or suggestion of an ejection element that is configured to break a seal between a substrate and a support surface. Instead, the disclosure of Cheng is limited to a vertically moveable susceptor 40 that supports a wafer and remains in contact with a back side of the wafer as it is being moved vertically within a reaction chamber. *See, e.g.*, col. 4, lines 29-43; Figures 2 and 5. The seal mentioned at col. 5, lines 29-55 of Cheng is a seal between a peripheral portion of an active surface of a wafer and a shield. Breaking this seal does not break a seal between the wafer and the support surface of the susceptor 40 upon which the wafer is positioned.

Claim 38 is further allowable because Tischler and Cheng both lack any teaching or suggestion of a piston with in a recess in a support surface (*e.g.*, the surface of susceptor 40).

Therefore, under 35 U.S.C. § 103(a), the subject matter recited in each of claims 20-26, 37-39, 44, and 45 is allowable over the subject matter taught in Tischler and Cheng.

Tischler, Cheng, and Jensen

Claims 27-34 are rejected under 35 U.S.C. § 103(a) for reciting subject matter which is purportedly unpatentable over that taught in Tischler, in view of teachings from Cheng and, further, in view of the teachings of Jensen.

Each of claims 27-34 is allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

In addition, it is respectfully submitted, that for the same reasons presented above, one of ordinary skill in the art wouldn't have been motivated to combine teachings from Tischler with teachings from Jensen. Cheng does not provide any teachings or suggestions that would remedy the aforementioned deficiencies of this asserted combination.

Claim 32 is additionally allowable since none of Tischler, Cheng, or Jensen teaches or suggests a support surface with a pressure port that is configured and oriented to facilitate a circulating air flow over the support surface.

Claim 33 is further allowable because Tischler, Cheng, and Jensen each lack any teaching or suggestion of an ejection element that is configured to facilitate grasping of at least one substrate positioned over a support surface. Instead of teaching an ejection element, the teachings of Tischler are limited to use of a conventional vacuum pick-up head to remove a wafer from the carrier disclosed therein. *See* Tischler, paragraph [0060].

Thus, under 35 U.S.C. § 103(a), the subject matter recited in each of claims 27-34 is allowable over the teachings of Tischler, Cheng, and Jensen.

Tischler, Zhang, and Cheng

Claims 58-60 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Tischler, in view of teachings from Zhang and, further, in view of the teachings of Cheng.

Claims 58-60 are each allowable, among other reasons, for depending directly or indirectly from claim 57, which is allowable.

Claims 58-60 are also allowable since Cheng does not provide any teaching or suggestion that would remedy the aforementioned deficiencies of the asserted combination of Tischler and Zhang.

Claim 58 is additionally allowable since none of Tischler, Zhang, or Cheng teaches or suggests an ejection element that is configured to break a seal between a substrate and a support surface. The disclosure of Tischler is limited to use of a conventional vacuum pick-up head (without teaching that a seal forms between wafers and the receptacles within which they are carried), while Zhang teaches a moveable stage 26 upon which a substrate 30 may be carried

(without teaching that a seal forms between the substrate 30 and the stage 26), and Cheng teaches a moveable susceptor 40 that moves a wafer but does not break contact with the wafer (without teaching that the wafer is sealed to the susceptor 40).

Claim 59 is additionally allowable because Tischler, Zhang, and Cheng lack any teaching or suggestion of an ejection element, let alone an ejection element that includes a piston within a recess in a support surface.

Claim 60, which depends from claim 59, is further allowable since none of Tischler, Zhang, or Cheng teaches or suggests a control element in communication with an actuator that is associated with a piston in such a way as to cause at least a portion of the piston to exit a recess and protrude from a support surface.

Tischler, Zhang, and Jensen

Claims 61-63 are rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is allegedly unpatentable over the teachings of Tischler, in view of teachings from Zhang and, further, in view of the subject matter taught in Jensen.

Claims 61-63 are each allowable, among other reasons, for depending directly or indirectly from claim 57, which is allowable.

Moreover for the reasons provided above, one of ordinary skill in the art wouldn't have been motivated to combine teachings from Tischler with teachings from either Zhang or Jensen.

Claim 62 is additionally allowable since none of Tischler, Zhang, or Jensen teaches or suggests a support surface with a pressure port that is configured and oriented to facilitate a circulating air flow over the support surface.

Tischler, Huang, and Penn

Claims 18 and 19 have been rejected under 35 U.S.C. § 103(a) for being directed to subject matter which is purportedly unpatentable over teachings from Tischler, in view of the subject matter taught in Huang and, further, in view of the teachings of U.S. Patent 6,169,605 to Penn et al. (hereinafter "Penn").

Claims 18 and 19 are both allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

Moreover, Penn provides no teachings that would remedy the aforementioned deficiencies with the asserted combination of teachings from Tischler and Huang.

Tischler, Cheng, and Huang

Claims 50, 51, and 54 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter that is assertedly unpatentable over the teachings of Tischler, in view of the subject matter taught in Cheng and, further, in view of teachings from Huang.

Each of claims 50, 51, and 54 is allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

Furthermore, Cheng provides no teaching or suggestion that remedies the above-noted deficiencies in the asserted combination of teachings from Tischler and Huang.

Additionally, none of Tischler, Cheng, or Huang teaches or suggests a planarization element configured to be drawn across a surface of unconsolidated material, as recited in claim 50.

With respect to the subject matter recited in claim 54, which depends from claim 50, none of Tischler, Cheng, or Huang teaches or suggests a lip that is configured to substantially confine a volume of unconsolidated material within the interior of a periphery defined thereby. Rather, the shield of Cheng is merely configured to prevent the exposure of edges and back side of a wafer from exposure to chemical reactants and their products. None of Tischler, Cheng, or Huang provides any teaching or suggestion that a planarization element may be translated across the surface of a shield of the type disclosed in Cheng.

Tischler, Cheng, Huang, and Penn

Claims 55 and 56 stand rejected under 35 U.S.C. § 103(a) for reciting subject matter which is assertedly unpatentable over that taught in Tischler, in view of the teachings of Cheng, Huang, and Penn.

Claims 55 and 56 are both allowable, among other reasons, for depending indirectly from claim 1, which is allowable.

Claims 55 and 56 are further allowable since neither Cheng nor Penn includes any teaching or suggestion that would remedy the deficiencies of the asserted combination of teachings from Tischler and Huang, as discussed above.

Withdrawal of the 35 U.S.C. § 103(a) rejections of claims 2, 10-13, 17-34, 37-42, 44, 45, 50, 51, and 54-63 is respectfully solicited, as is the allowance of each of these claims.

Allowable Subject Matter

The indication that claims 14-16, 46-49, 52, and 53 recite allowable subject matter is gratefully acknowledged. Nonetheless, none of these claims has been amended to independent form, as the claims from which they depend are also believed to be allowable.

CONCLUSION

It is respectfully submitted that each of claims 1-63 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brick G. Power", with a long horizontal flourish extending to the right.

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